nanni diesel

energy in blue

English

Base

TOYOTA

Common Rail

This photograph does not necessarily represent the engine

Reference : 970 313 790

Date : 06/2007

Indice : A

Technical characteristics

Engine specifications	T4.165	T4.180	T4.200
Cycle	4 strokes, Diesel		
Number of cylinders / Arrangement	4 in line		
Bore / Stroke	96 mm x 103 mm		
Displacement	2,982 litres		
Distribution	16 valves, gears & belt		
Compression rate	17,9/1		
Aspiration	Turbo Intercooler		
Direction of rotation (from flywheel)	Counter clockwise		
Weight dry with gearbox (TTM40A)	362 kg		
Max. power*	121,5 kW (165 hp)	132,5 kW (180 hp)	147,2 kW (200 hp)
Max rated rpm speed*	3400 rpm		
Idle rpm speed	700 to 750 rpm		
No load rpm speed	4000 rpm		
Specific fuel consumption	236 g/kW/h at 3400 rpm		

Fuel supply

Injection	Direct - Common Rail
Injection order	1-3-4-2
Fuel timing	11,8°at 3400 rpm before TDC, ECM controlled
Injection pump	DENSO HP3
Injection pressure	Up to 180 MPa, ECM controlled

Lubrication

Engine oil	API CD-SAE 15W40 (temperate climate)
Engine oil capacity	6,4 to 7,7 litres depending inclination

Cooling

Cooling	Dual circuit sweet water / sea water with heat exchanger
Seawater pump	Neoprene rotor type
Coolant for heat exchanger version	Around 15,5 litres, 50% water + 50% mixture of antifreeze and

Electrical system

Alternator	12 V / 100 A
Alternator belt tension	Auto-tensioner
Battery capacity (min.)	110 A/h - 400A

Connections

Exhaust	90 mm
Fuel (suction and return)	10 mm
Seawater	38 mm
Max. mounting angle	7°(dynamic)

⚠These specifications are for marine pleasure only.

* For more information concerning your transmission, refer to its specific manual.

The recommended cruise speed is 200 rpm below rated RPM speed.

*At engine flywheel, according to ISO 8665-1.

Refer to the maintenance and servicing section in the manual for information on the regular servicing checks and operations to be performed.

Operation : Inspect, Adjust, Clean, Replace

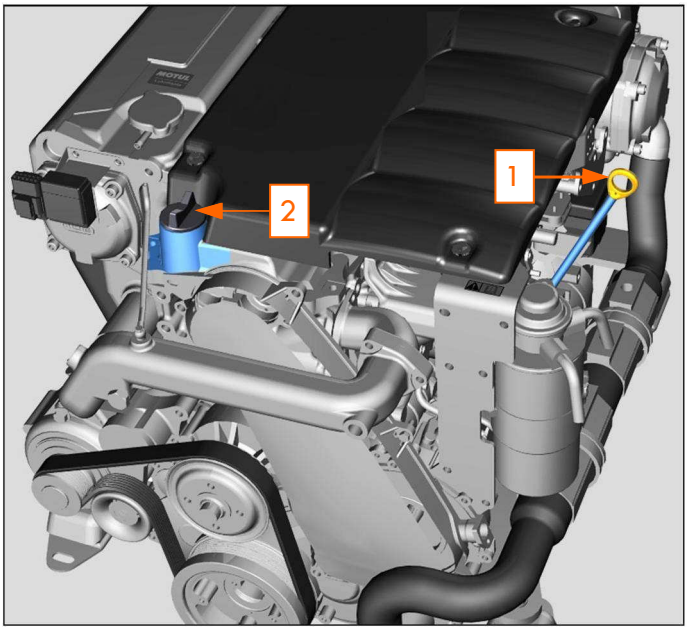
Information given in italics refers to equipment not necessarily forming part of your engine.

Gearbox (refer to specific manual for this component)

Subset	Component	Operation	Frequency
Fuel supply	Fuel filter	**R**	After 20 hours then every 100 hours or every year
Exhaust elbow	Zinc anode	**I / R**	
Engine block	Tension of belts	**R**	
	Tightening of attaching parts and clamps	**I / A**	
Control unit	Cables accelerator / reverse, *Trolling*, General lubrication	**I**	
Fuel supply	Air filter (cleaning kit)	**I / C / R**	Every 200 hours or every year
Cooling	Seawater pump rotor	**R**	
Electrical system	Starter (attachment)	**I / A**	
	Alternator (attachment)	**I / A**	
Engine block	Cleaning and protection of engine	**I / A / C**	Every year
Fuel supply	Fuel pre-filter (cartridge)	**R**	After 20 hours then every 200 hours or every year
Engine block	Attachment of engine suspensions / alignment	**I / A**	
Electrical system	Battery	**I**	
Lubrication	Engine oil (change)	**R**	
	Engine oil filter	**I / A / R**	
	Gearbox oil filter	**R**	
Cooling	Cooling circuit (rinsing)	**C**	Every 2 years
Fuel supply	Adjustment of valve clearance	**I / A**	Every 400 hours or every 2 years
	Calibration of injectors	**I / A / R**	
	Turbo	**I / C**	
Cooling	Coolant change	**R**	
	Exchanger manifold or keel cooling	**I / C**	
	Gearbox oil cooler manifold	**I / C**	
	Calibrated plug of temperature exchanger	**R**	
	Thermostat	**R**	

Inspection and adjustment of the levels

Oil level

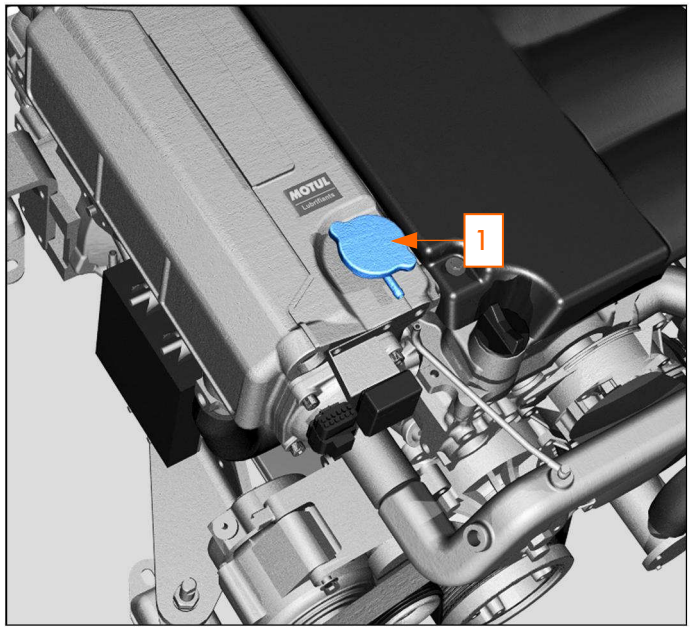


1 - Oil gauge
2 - Oil filler port

⚠The oil checks must always be performed with the engine stopped and cold. Be careful, these fluids are flammable. Do not smoke in the vicinity of these fluids and do not allow for any sparks or flame in the vicinity.

Engine casing oil: remove the gauge, wipe off the gauge and reinstall it in the gauge tube. Pull out the gauge again and check the oil level. It should be located between the min. and max. positions on the gauge.
If necessary, top up the oil level: open the air filler port, pour the recommended oil (see technical characteristics in appendices) to reach the max. level indicated on the gauge without exceeding the max. level. Close the oil filler port.

Coolant level

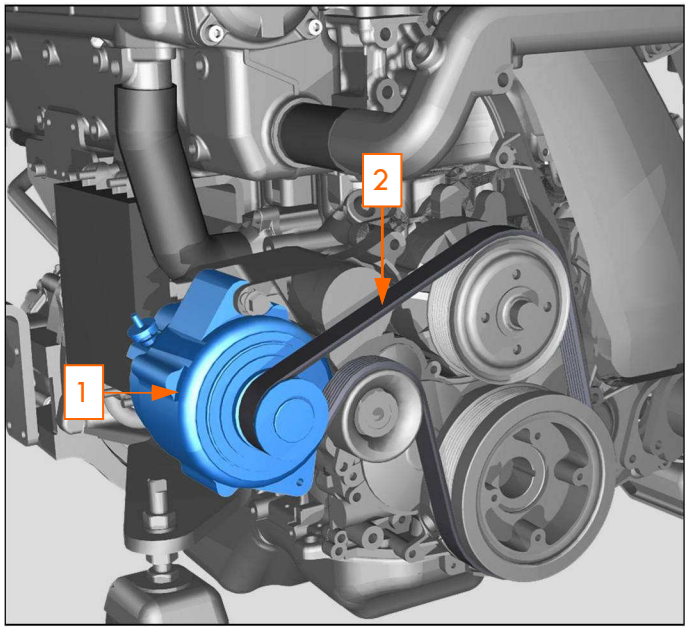


1 - Coolant plug
2 - Expansion tank

⚠When filling the cooling system, the coolant level must be checked after 10 minutes of use since the system purges itself automatically. Top up if necessary.

Turn the filler plug up to its first stop to allow the pressure in the system to escape before removing the plug.
Inspect the fluid level. The level should be between the lower edge of the filler neck and the level pin (if equipped), respectively representing the minimum and maximum level in the expansion chamber.
Top up if necessary using a fluid comprising 50% water and 50% antifreeze.

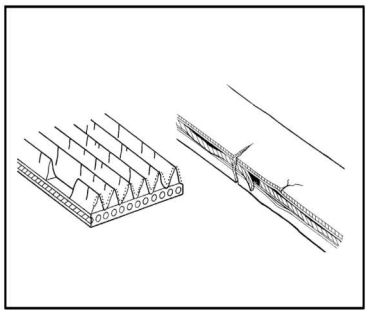
Alternator belt



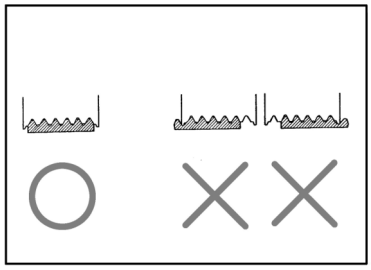
1 - Alternator
2 - Alternator belt

⚠Perform this operation with the engine stopped.

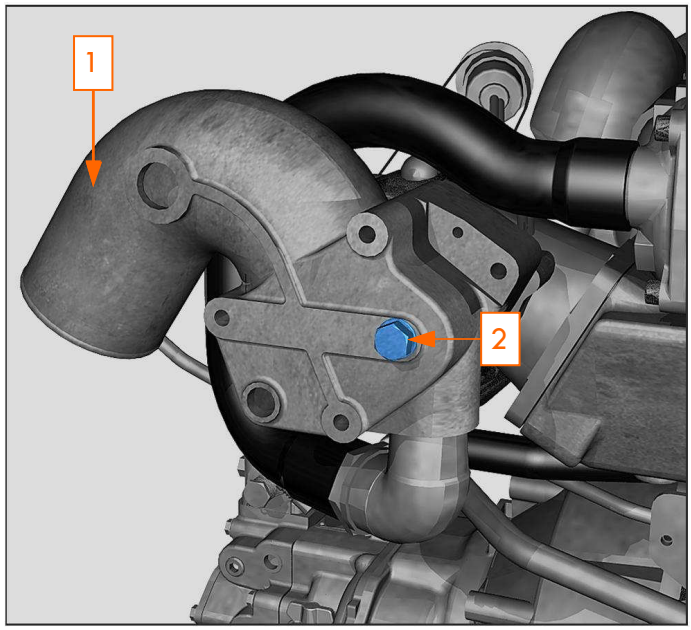
Inspect drive belt : Visually check the belt for excessive wear, frayed cords, etc. If any defect has been found, replace the drive belt. If the belt has chunks missing from the ribs, it should be replaced.



Check that it fits properly in the ribbed grooves. Check with your hand to confirm that the belt has not slipped out of the groove on the bottom of the pulley.



Zinc anode



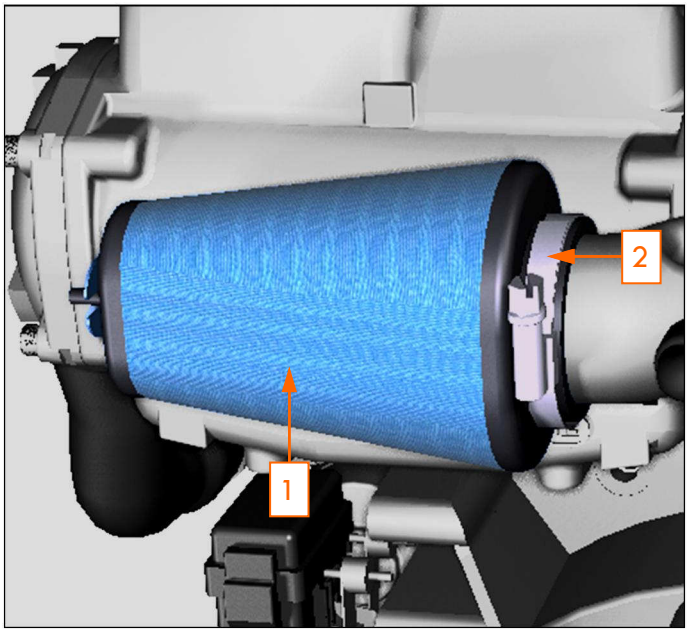
1 - Exhaust elbow
2 - Zinc Anode

⚠Perform this operation with the engine stopped.

A zinc anode forms part of the exhaust elbow . It serves as an anticorrosion anode. The anode must be replaced when more than 50% of it has been consumed.
Diameter : 10 mm
Length : 16 mm

Non-binding photographs. The coupled equipment and accessories can vary according to your level of equipment.

Air filter

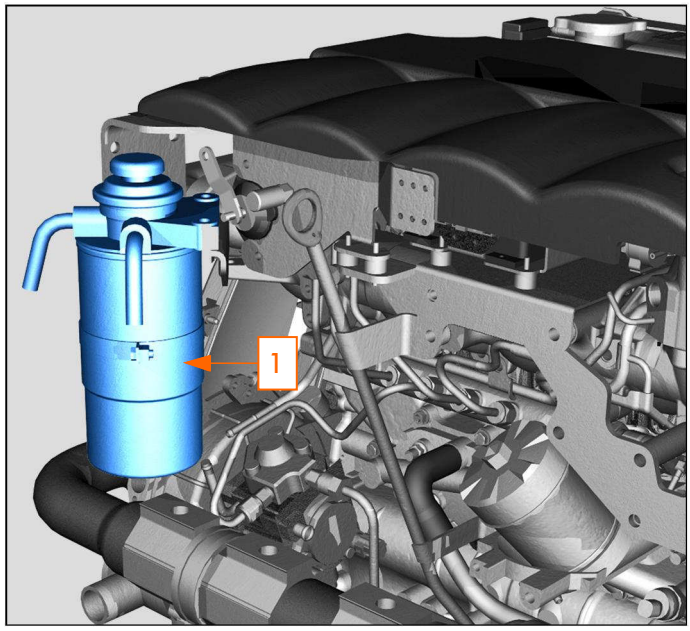


1 - Air filter
2 - Clamp

⚠Be sure no impurities get into the engine.

Remove the clamp from the hose and remove the filter. Remove the spring inside the filter. If necessary, clean the filter by washing it with soapy water. Then, rinse the filter with clear water. Press the filter to remove any water and to dry it.
NANNI DIESEL has designed a cleaning kit which is suited to certain models of the air filter.
Use of this kit is recommended on our engines to perform effective cleaning and ensure good engine « breathing ».

Fuel filter

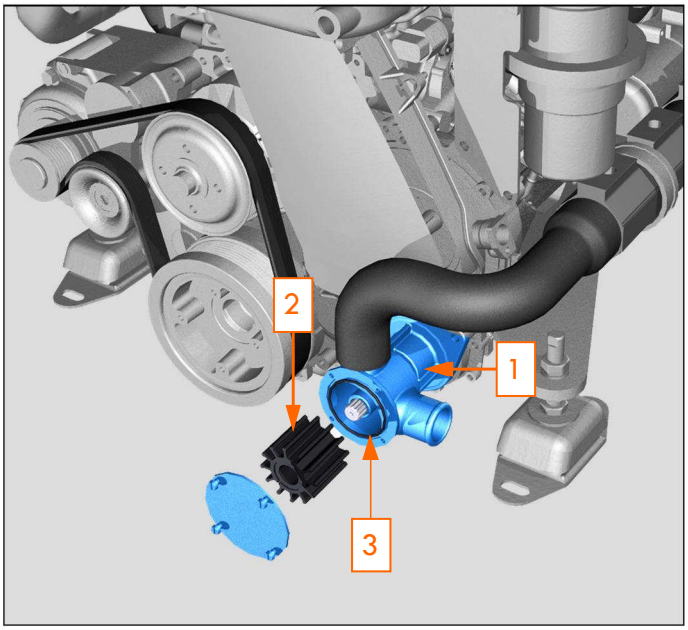


1 - Fuel filter cartridge

⚠Always sponge up any fuel which may have spilled Observe the environment protection rules.

The fuel filter is a throw-away type filter. The fireguard envelope and the water probe must be preserved and reinstalled correctly (if equipped). The fire guard must not come into contact with the plastic purge screw.
-Close the fuel valve
-Unscrew the cartridge from the filter head
-Coat the seal of the new cartridge with clean oil
-Screw the new cartridge on the filter head, then tighten by hand by ¾ turn (do not use a tool).
-Reinstall the probe and the purge screw (if equipped). Check the seal
-Open the fuel valve
-Purge the circuit
-Start up the engine and check for any leaks

Sea-water pump

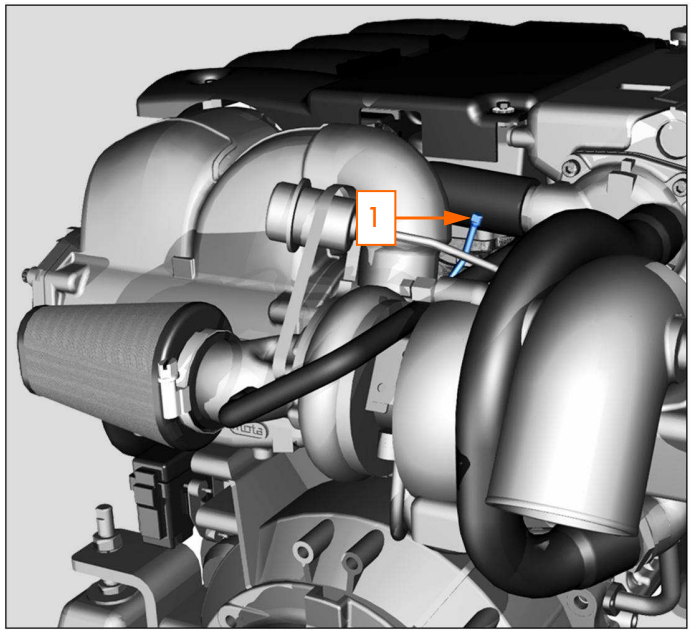


1 - Sea-water pump
2 - Impeller
3 - Sea-water pump gasket

⚠Close the seawater intake valve as there is a risk of water penetrating into the engine.

-Close the seawater intake valve
-Close the seawater pump cover
-Using a channel lock pliers, remove the worn Impeller
-If the rotor shows any signs of cracks or defects, it should be replaced
-Clean the parts preserved
-Fit a new rotor by applying a clockwise rotary movement
-Install the seawater pump cover using a new seal
-Open the seawater intake valve
-Start-up the engine and check for any leaks in the circuit

Engine oil drain



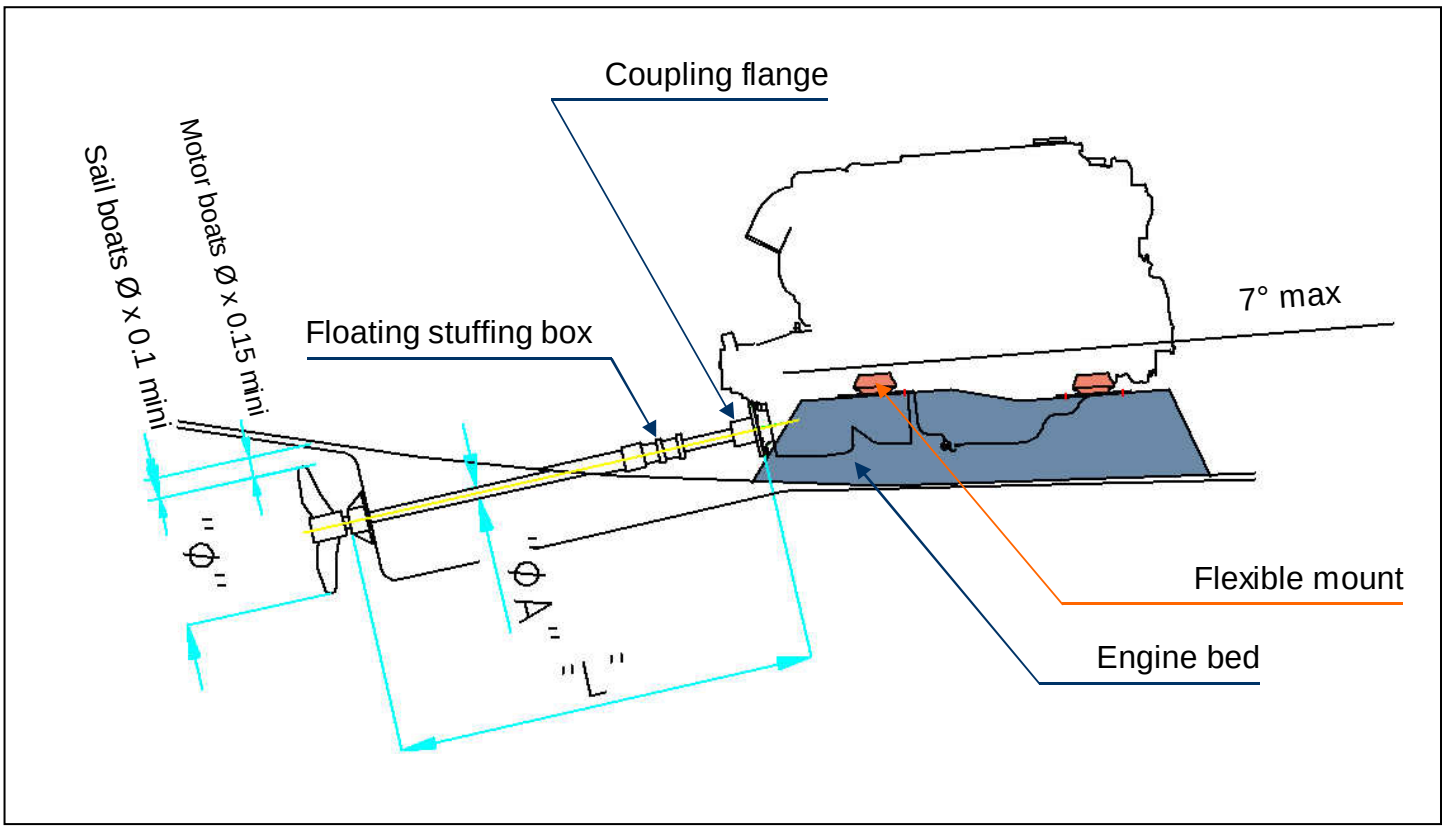
1 - Oil drain pump

⚠Hot oil can burn. Avoid any contact with the skin. Observe the environment protection rules.

-The oil is removed using a drain pump, preferably: engine slightly warm,
-Fully pump out all the oil,
-Fill with new oil,
-Check the oil level using the gauge,
-Do not exceed the maximum level.

Non-binding photographs. The coupled equipment and accessories can vary according to your level of equipment.

Propeller shaft

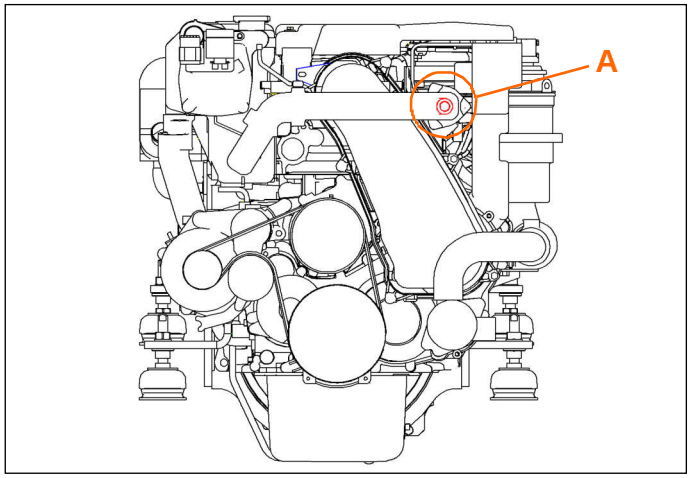


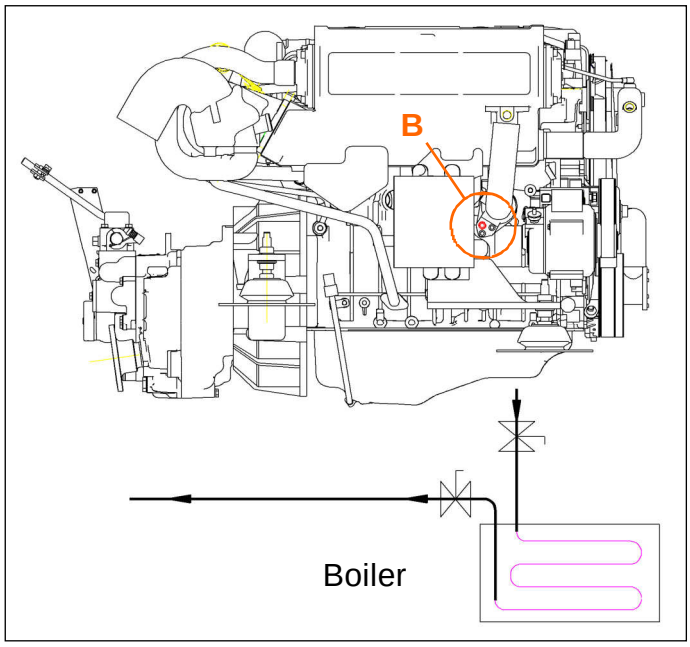
Engine bed

Rigid structure able to absorb all the dynamical stress, and the engine weight.
It must be linked to the hull with a surface as large as possible.

Engine	Reduction ratio	ØA (mm)	Ø (inches)	L (meter)	Engine RPM		
					Idling	Maxi rated load	Maxi without load
T4.165	Information on request Fill in the propulsion Calculation form				700 / 750	3400	4000
T4.180							
T4.200							

Boiler connections

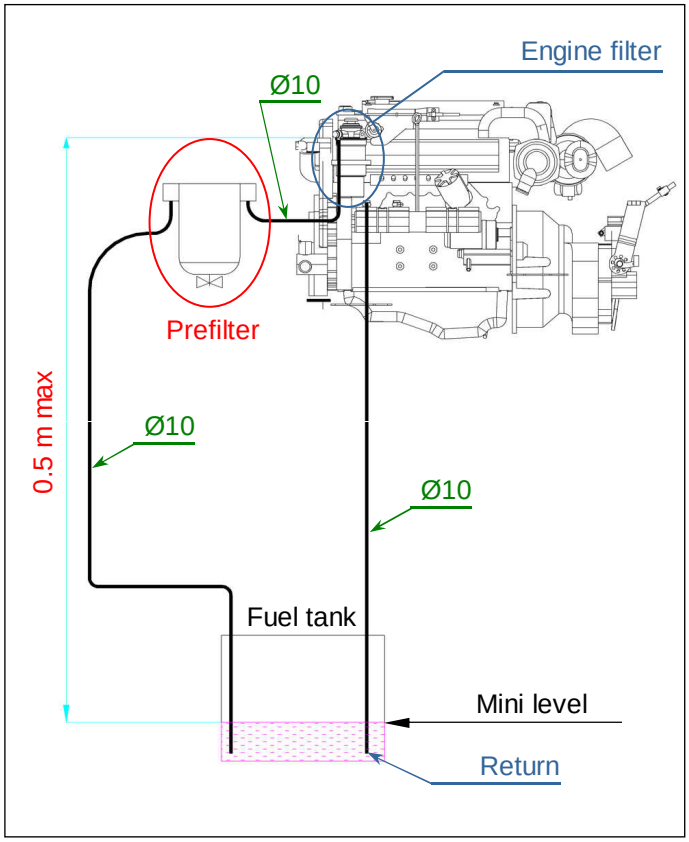




A - Water inlet 3/8G
B - Water outlet M14

- Ø pipe = 15 mm (maxi)
- Pipes must be as short as possible with a minimum bend
- Pipe must be flexible (max temp hoses 100℃)
- The heater must be located below the engine level (if not possible contact us.)
- Heater connection plugs kit Ref 899 000 163
- The heater lines must be equipped with valves

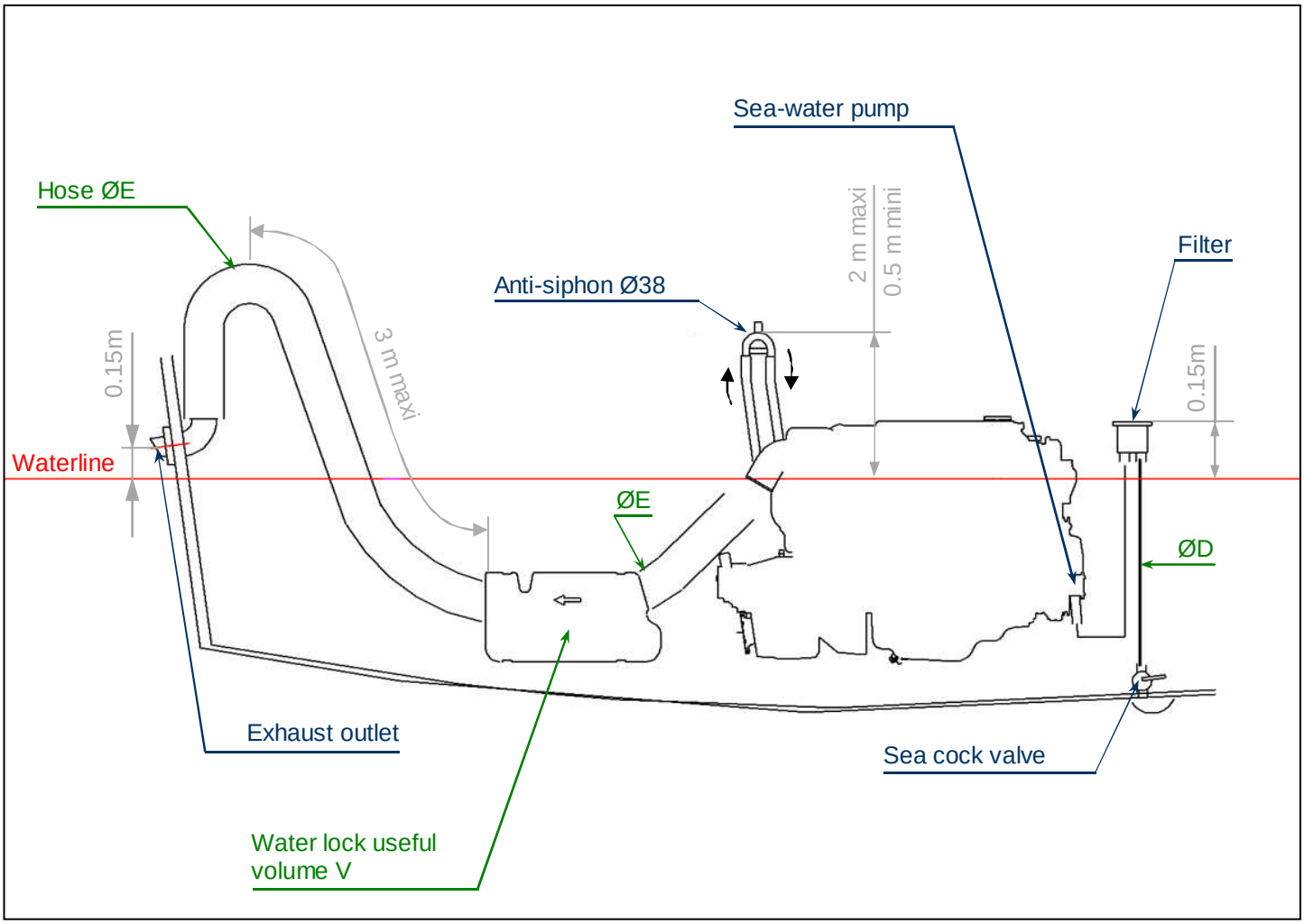
Fuel connections



-Prefilter has to be as low as possible,
-The return to tank must be below the mini fuel level.

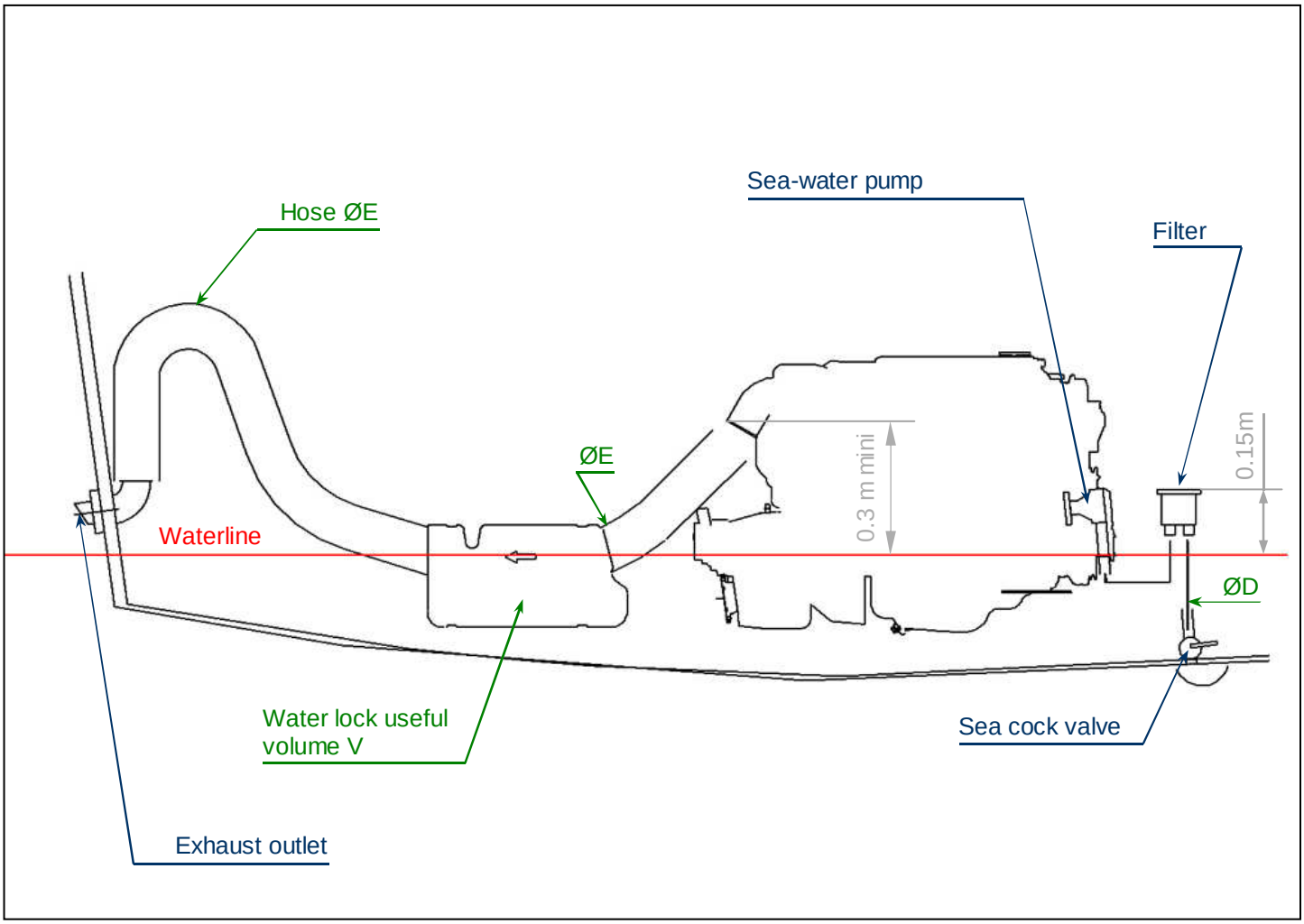
Sea water pick-up and exhaust lines

Engine under waterline



Engine	ØD (mm)	ØE (mm / inches)	Max back-pressure (kPa / PSI)	V mini (litre)
T4.165	38	90 / 3.54"	28.7 / 4.162	20
T4.180	38	90 / 3.54"	28.7 / 4.162	20
T4.200	38	90 / 3.54"	28.7 / 4.162	20

Engine under waterline



All sail boat

Anti syphon valve

Must be at the end of raw water piping before exhaust elbow inlet

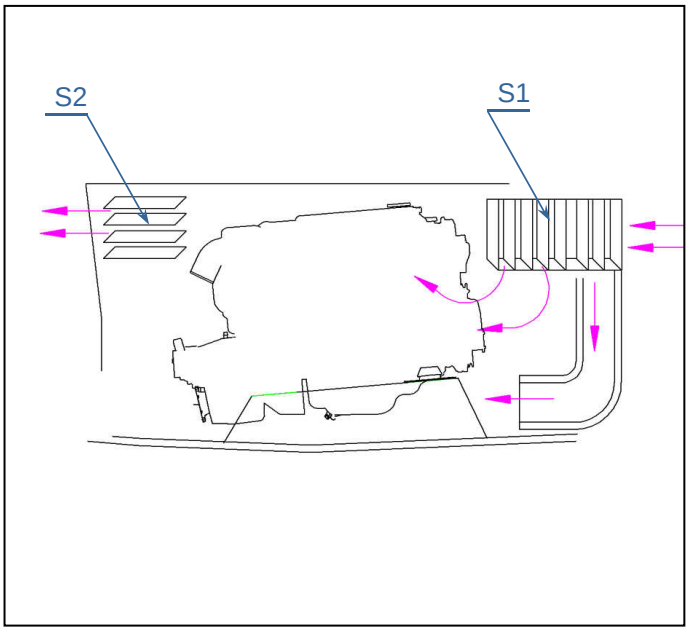
Water lock

Must be always lower and near the engine

Motor boats

Air requirement

Dynamical system



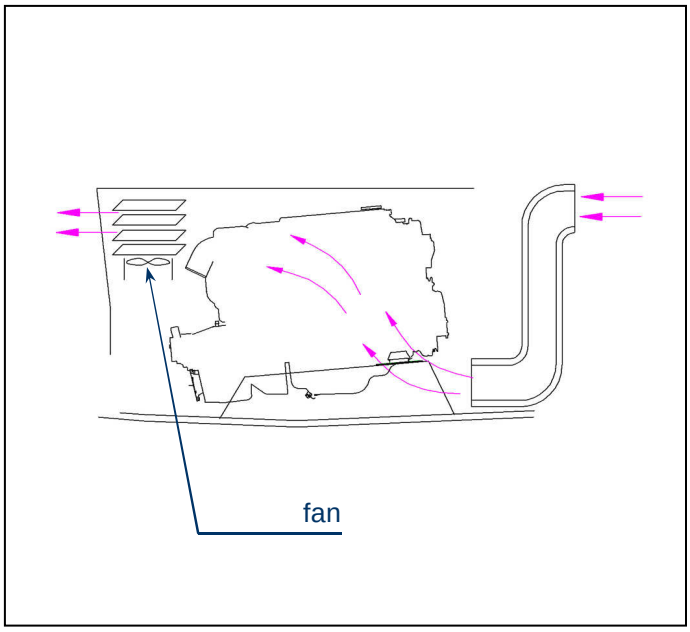
S1 mini = 580 cm^2 (680 cm^2)
S2 mini = 310 cm^2 (360 cm^2)

Ventilation system
Dynamical (for fast boat)
Forced (by fan)

Air needs

Outlet of warm air :	900 m^3/h
Engine air consumption :	620 m^3/h
Total :	1520 m^3/h

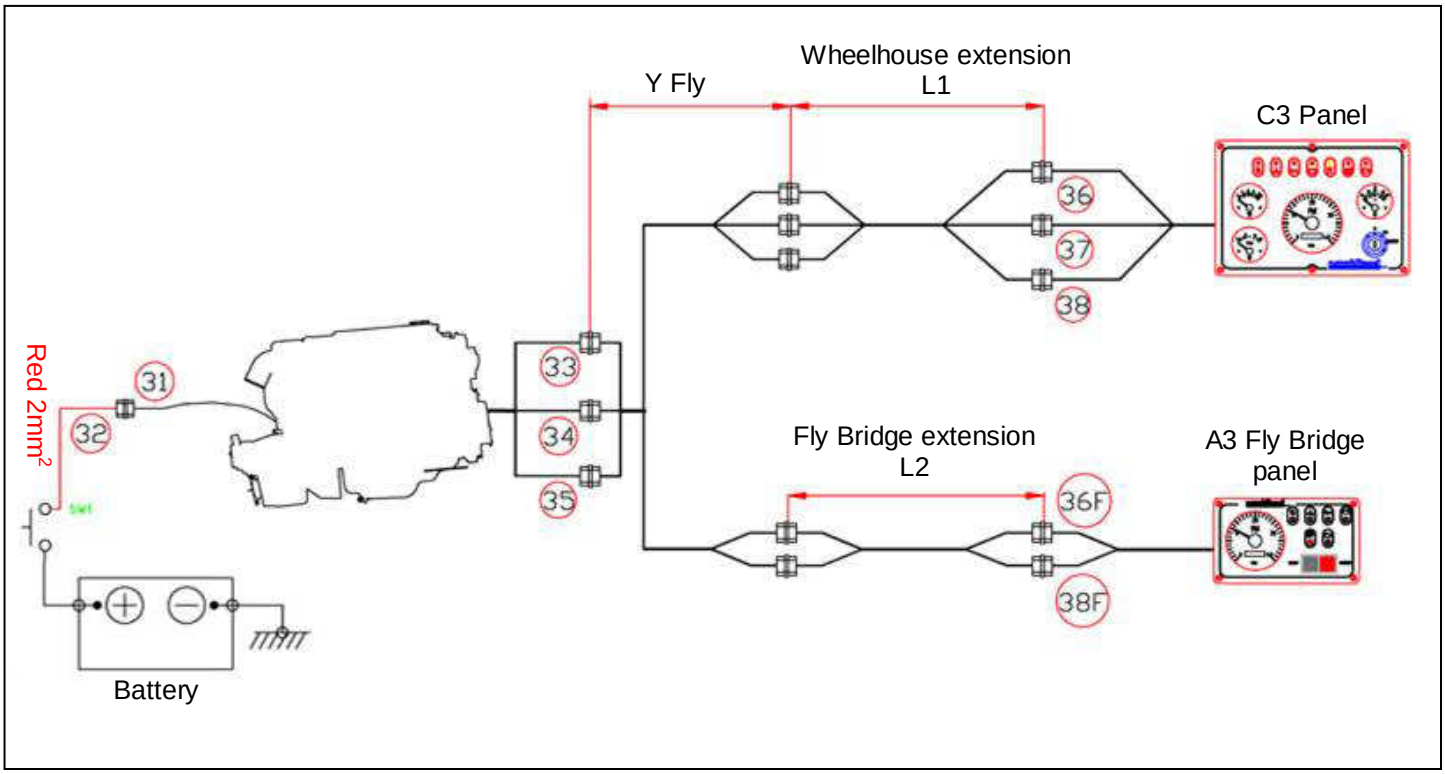
Forced system (by fan)



Engine room temperature
Nor more than 50℃ with a difference of 15℃ (20℃ maxi) with ambient temperature.

Air flow
Fresh air inlet, on the front in the lower part of the engine room and warm air outlet on the back in the upper part.
Avoid short-circuit between inlet and outlet in order to have a maximum air move.

C3 Panel



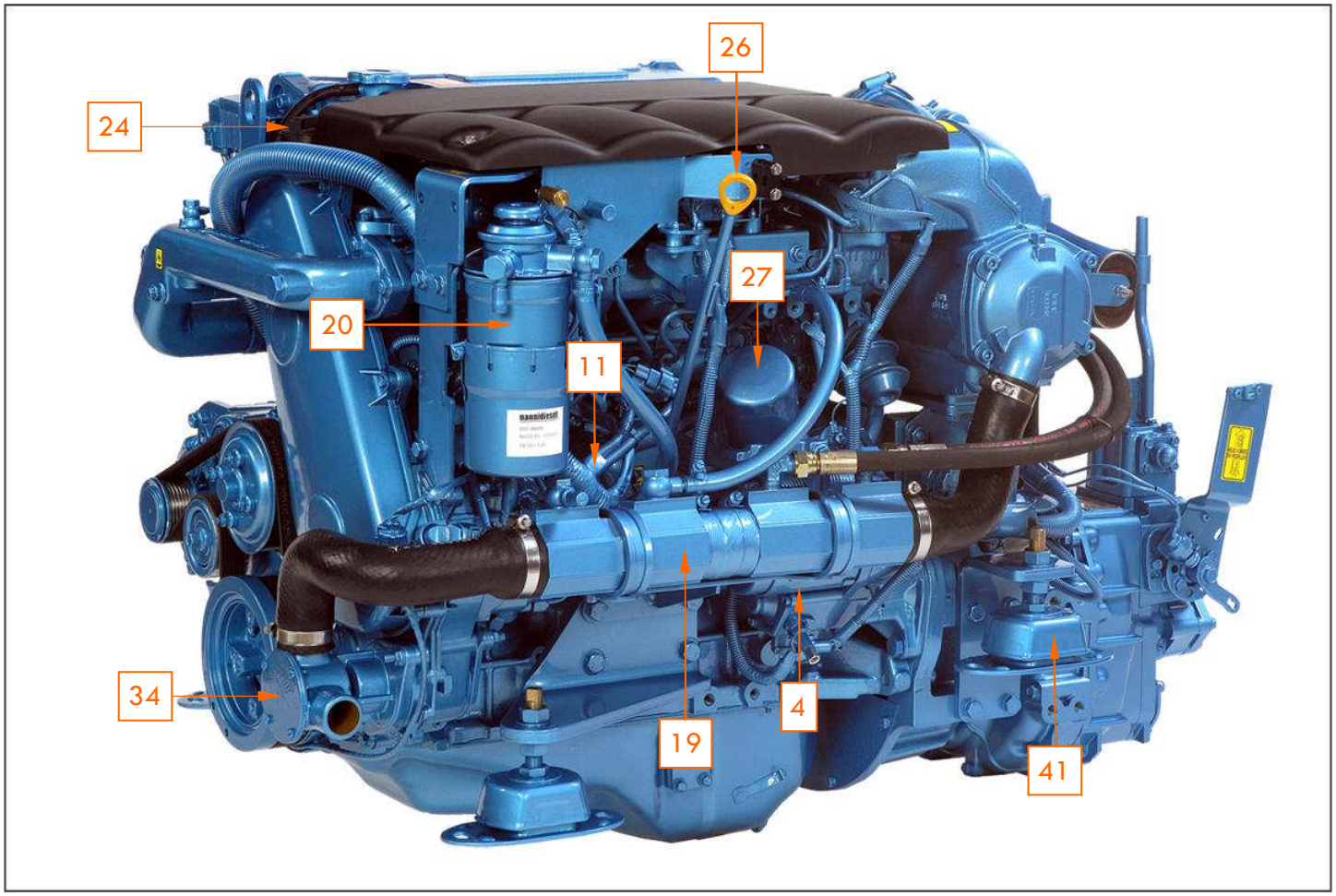
References:

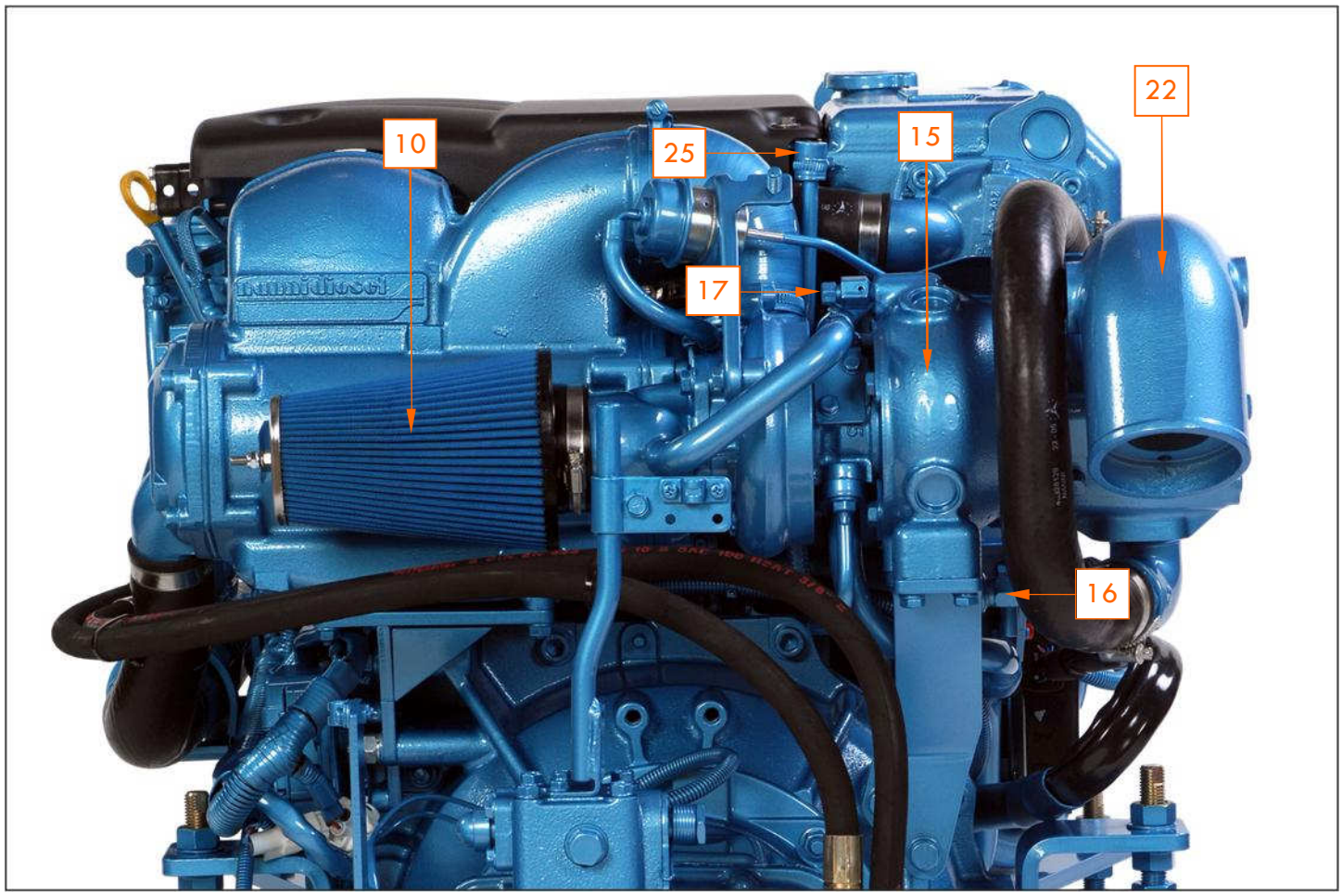
C3 panel :	674 455
A3 Fly Bridge :	674 470
Y Fly :	674 484

Wheelhouse extension references		
L1 =	4 meters	674 456
L1 =	6 meters	674 457
L1 =	8 meters	674 458

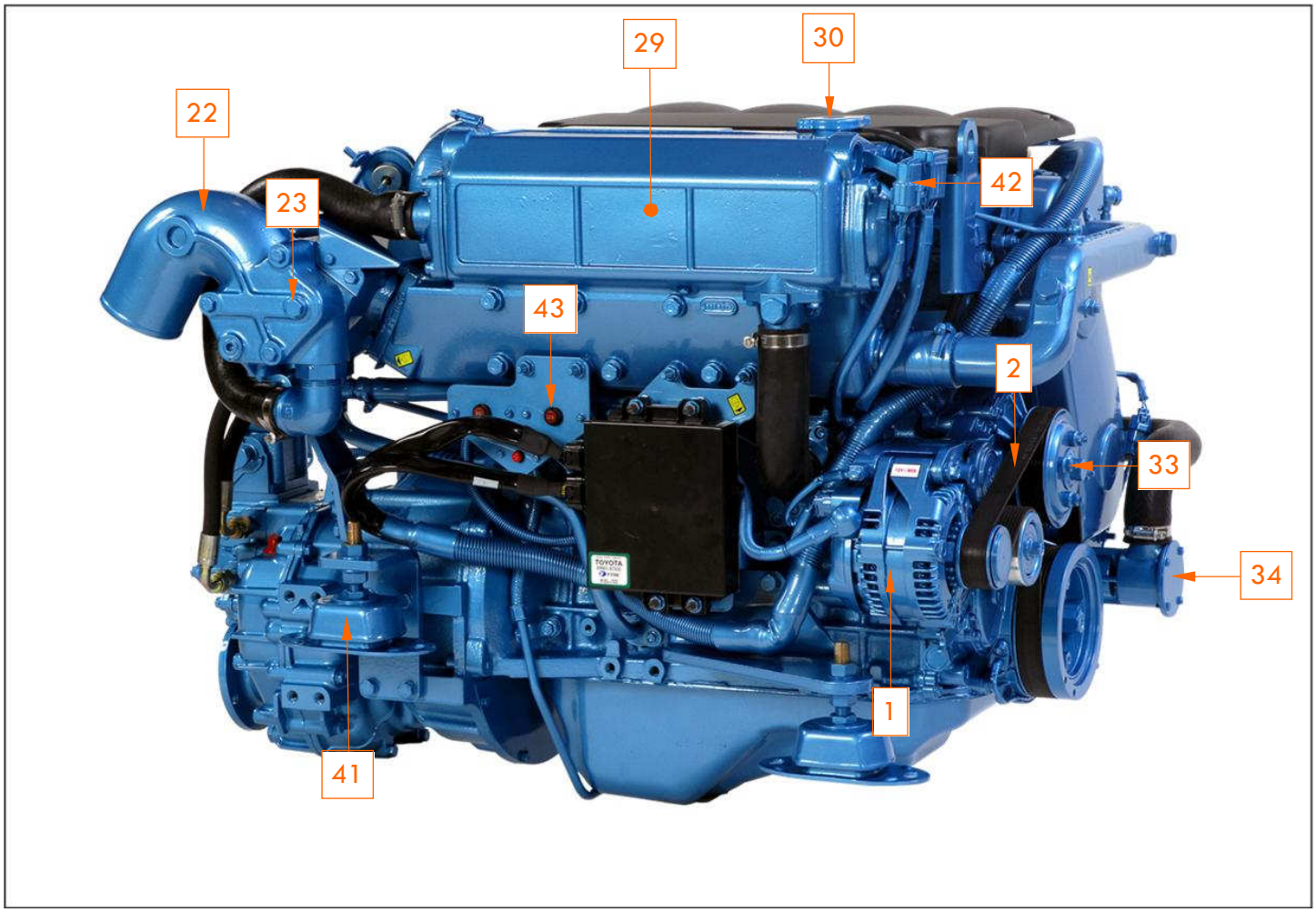
Fly bridge extension references		
L2 =	4 meters	674 427
L2 =	6 meters	
L2 =	8 meters	674 443

Main parts of the engine





Non-binding photographs. The coupled equipment and accessories can vary according to your level of equipment.



1 - Alternator

2 - Alternator belt

4 - Starter

10 - Air filter

11 - Injection pump

14 - Acceleration control

15 - Turbocharger

16 - Turbo drain valve

17 - Turbo degassing valve

19 - Fuel cooler

20 - Fuel filter and water detector

22 - Water injection exhaust elbow

23 - Anticorrosion anode

24 - Oil filler port

25 - Oil drain (suction tube

26 - Oil gauge

27 - Oil filter

29 - Heat exchanger

30 - Coolant filler port

33 - Freshwater pump

34 - Sea-water pump

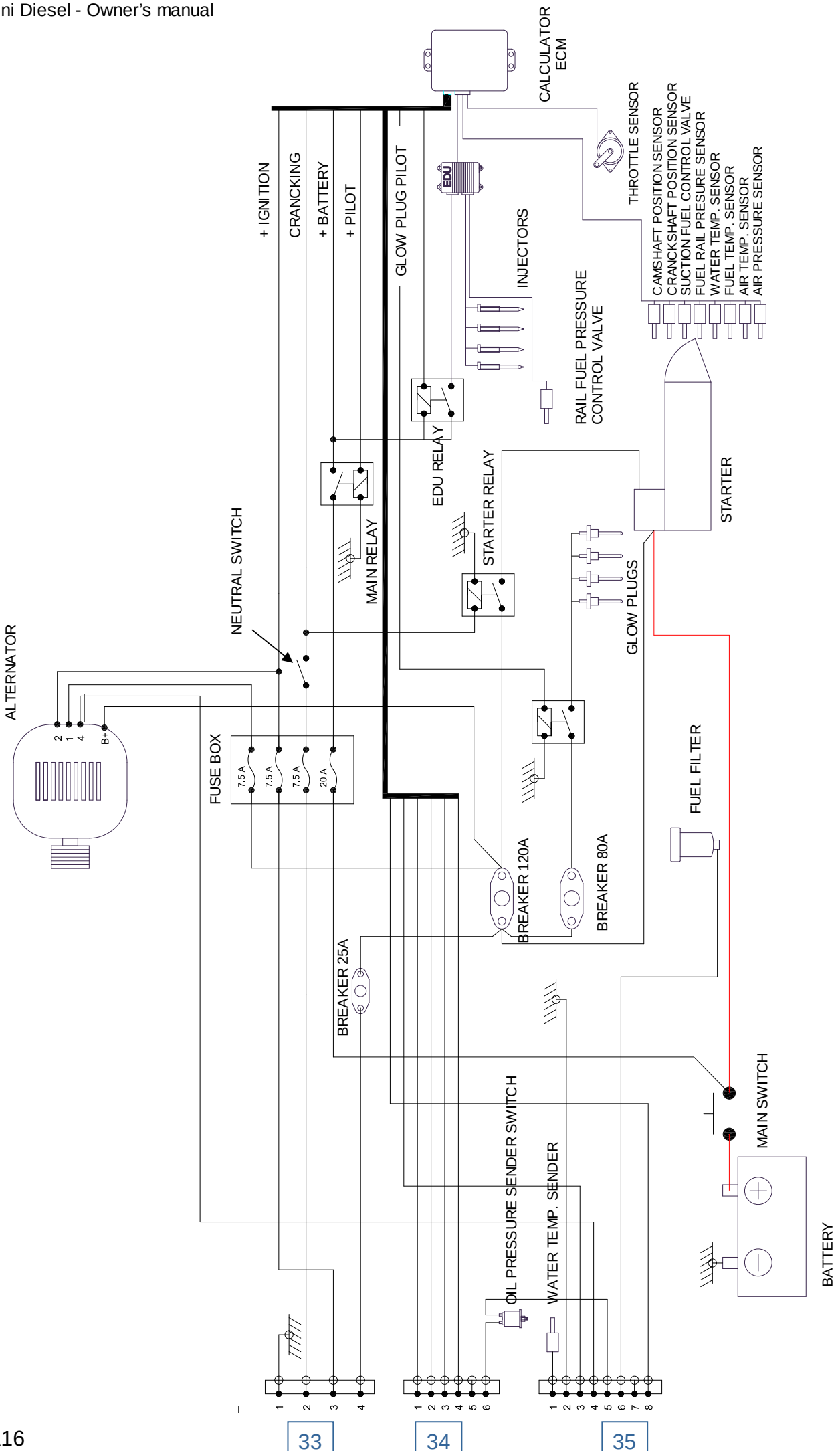
36 - Exchanger drain plug

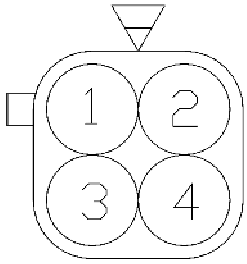
40 - Gearbox

41 - Flexible suspension

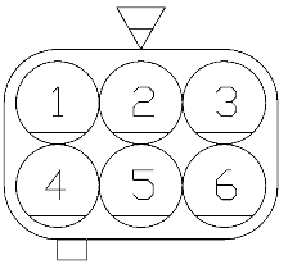
42 - Fuse box

43 - Circuit breaker

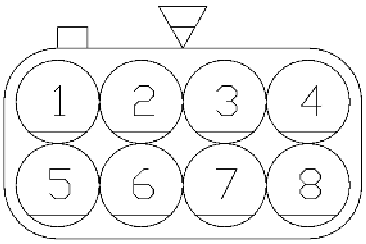

CALCULATOR ECM
THROTTLE SENSOR
CAMSHAFT POSITION SENSOR
CRANCKSHAFT POSITION SENSOR
SUCTION FUEL CONTROL VALVE
FUEL RAIL PRESURE SENSOR
WATER TEMP. SENSOR
FUEL TEMP. SENSOR
AIR TEMP. SENSOR
AIR PRESSURE SENSOR
+ IGNITION
CRANCKING
+ BATTERY
+ PILOT
GLOW PLUG PILOT
INJECTORS
RAIL FUEL PRESSURE CONTROL VALVE
EDU RELAY
STARTER RELAY
MAIN RELAY
NEUTRAL SWITCH
STARTER
GLOW PLUGS
ALTERNATOR
FUSE BOX
7.5 A
7.5 A
7.5 A
20 A
BREAKER 120A
BREAKER 80A
FUEL FILTER
BREAKER 25A
MAIN SWITCH
OIL PRESSURE SENDER SWITCH
WATER TEMP. SENDER
BATTERY
33
34
35



4 ways connector (n°33)		
Pos.	*Wire colour / size (mm2)*	*Function*
1	Black 3.00	Earth
2	Brown 3.00	Crank
3	Red - Yellow 3.00	+ Ignition
4	Red - Blue 3.00	+ Battery



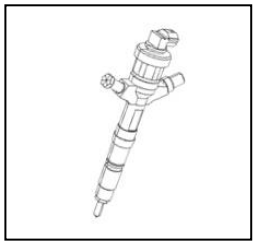
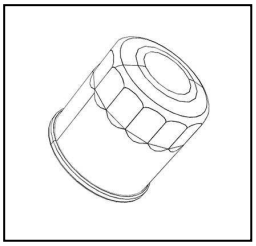
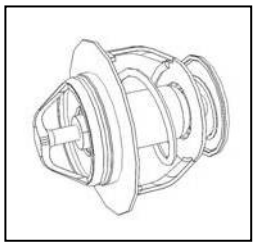
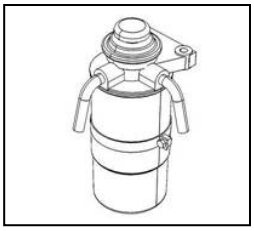
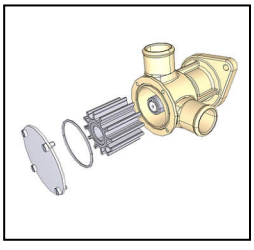
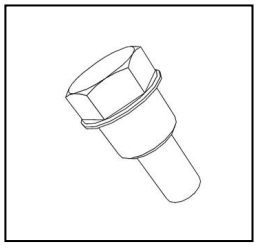
6 ways connector (n°34)		
Pos.	*Wire colour / size (mm2)*	*Function*
1	White - Orange 1.00	Check
2	Dark blue 1.00	+ Tachometer
3	Dark blue - Black 1.00	- Tachometer
4	Yellow - Black 1.00	Glow plug lamp
5		
6	Grey 1.00	Oil pressure gauge



8 ways connector (N°35)		
Pos.	*Wire colour / size (mm2)*	*Function*
1	Orange - Blue 1.00	Water temperature gauge
2	Black 1.00	Earth
3	Yellow - Green 1.00	Warning water temperature
4	Purple 1.00	Warning battery charge
5	Pink - Black 1.00	Warning oil pressure
6	Light blue 1.00	Warning water in fuel
7		
8	Grey - Black 1.00	Warning turbo pressure

Recommended on-board kit

Concerning the checks to be performed on installation (see chapter 4 on installation), you can order the installation documentation from NANNI INDUSTRIES.

Part name Alternator belt **Reference** 970 313 801 	**Part name** Porte injecteur **Reference** 970 314 055 
Part name Engine oil filter **Reference** 970 313 306 	**Part name** Thermostat **Reference** 370 314 033 
Part name Fuel filter **Reference** 970 313 374 	**Part name** Air filter **Reference** 970 301 330
Part name Sea-water pump kit **Reference** 970 312 432 	**Part name** Anode **Reference** 970 494 635 

This section presents the various dashboards used to date with our marine engines. In the event of modification of the dashboards, we reserve ourselves the right to present new models in the appendices.

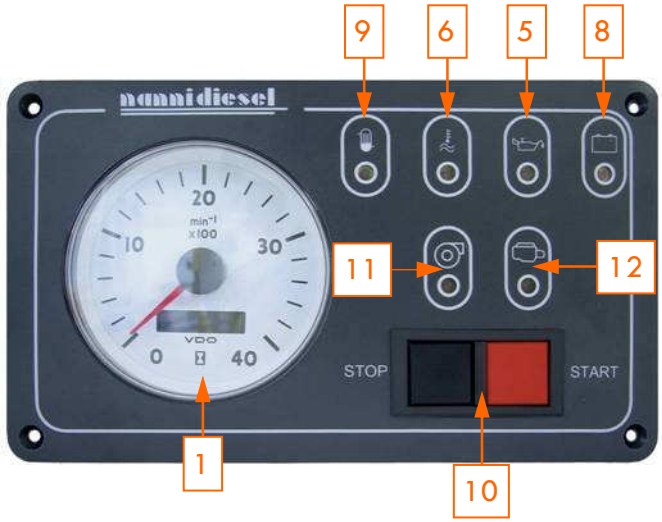
Some panels are not available with the whole range of engines.
The instruments shown often consist of safety indicator lights. Take the necessary time to become familiar with these instruments and check them regularly when operating the engine.

C3 Common Rail panel

270 x 187 mm

A3 Fly panel

205 x 120 mm



1 - Tachometer and hour meter

2 - Voltmeter

3 - Engine oil pressure

4 - Coolant temperature

5 - Low engine oil pressure with buzzer

6 - High coolant temperature with buzzer

7 - Preheating

8 - Battery charge with buzzer

9 - Water present in fuel filter

10 - Switch on / off

11 - Turbocharger pressure with buzzer

12 - Engine control with buzzer

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